What is claimed is:

1. A method of etching a silicon containing material on a substrate, the method comprising

placing the substrate in a process chamber and

providing in the process chamber, an energized gas comprising fluorine-containing gas, chlorine-containing gas and sidewall-passivation gas.

2. A method according to claim 1 wherein the silicon-containing material on the substrate comprises regions having different compositions, and wherein the volumetric flow ratio of the fluorine-containing gas, chlorine-containing gas, and sidewall-passivation gas is selected to etch the regions having different compositions at substantially similar etch rates.

3. A method according to claim 2 wherein the silicon-containing material comprises polysilicon.

4. A method according to claim 3 wherein the regions having different compositions comprise dopant in a plurality of concentrations or types.

5. A method according to claim 2 wherein the substantially similar etch rates are etch rates that vary by less than about 5%.

6. A method according to claim 1 wherein the volumetric flow ratio of the fluorine-containing gas to the chlorine-containing gas is from about 2.1 to about 8:1.

7. A method according to claim 1 wherein the fluorine-containing gas comprises one or more of NF_3, CF_4 or SF_6.

8. A method according to claim 1 wherein the chlorine-containing gas comprises one or more of Cl_2 or HCl.

9. A method according to claim 1 wherein the sidewall-passivation gas comprises one or more of nitrogen, hydrogen or carbon-monoxide.

10. A method according to claim 9 wherein the volumetric flow ratio of the fluorine-containing and chlorine-containing gas to the sidewall-passivation gas is from 1:1 to about 10:1.

11. A method according to claim 1 wherein the energized gas is absent HBr, Br_2 or CH_3Br.

12 A method according to claim 11 further comprising a second etch step in which a second energized gas comprising HBr is provided in the process chamber.

13. A method according to claim 12 wherein the second energized gas further comprises one or more of Cl_2, $He\text{-}O_2$ and CF_4.

14. A method of etching a substrate in a process chamber while simultaneously cleaning surfaces in the process chamber, the method comprising:

placing the substrate in the process chamber, the substrate comprising a silicon-containing material having a plurality of dopant concentrations or dopant types; and

providing in the process chamber, an energized process gas comprising fluorine-containing gas, chlorine-containing gas and sidewall-passivation gas, whereby the plurality of dopant concentrations or dopant types in the silicon-containing material, are etched at substantially similar rates.

15. A method according to claim 14 wherein the volumetric flow ratio of the fluorine-containing gas, chlorine-containing gas and sidewall-passivation gas, is selected to etch the plurality of dopant concentrations or dopant types in the polysilicon

16. A method according to claim 14 wherein the volumetric flow ratio of the fluorine-containing gas to the chlorine-containing gas is from about 2:1 to about 8:1.

17. A method according to claim 14 comprising at least one of the following characteristics (i) the fluorine-containing gas comprises one or more of NF_3, CF_4 or SF_6; (ii) the chlorine-containing gas comprises one or more of Cl_2 or HCl; or (iii) the sidewall-passivation gas comprises one or more of nitrogen, hydrogen or carbon monoxide.

18. A method according to claim 14 wherein the volumetric flow ratio of the fluorine-containing and chlorine-containing gas to the sidewall-passivation gas is from about 1:1 to about 10:1.

19. A method according to claim 18 wherein the energized gas is absent HBr, Br_2 or CH_3Br.

20. A method according to claim 19 further comprising a second etch step in which a second energized gas comprising HBr is provided in the process chamber.

21. A method according to claim 20 wherein the second energized gas further comprises one or more of Cl_2, He-O_2 and CF_4.

22. A process chamber comprising

a substrate support,

a gas source for providing process gas comprising fluorine-containing gas, chlorine-containing gas, and sidewall-passivation gas,

a gas energizer, and

a gas exhaust,

whereby a substrate received on the support may be processed by process gas provided by the gas source, energized by the gas energizer, and exhausted by the gas exhaust.

23. An apparatus according to claim 22 further comprising a controller that is adapted to control the volumetric flow ratio of the fluorine-containing gas, chlorine containing gas, and sidewall-passivation gas to etch regions on the substrate having different compositions at substantially similar etch rates.

24. An apparatus according to claim 23 wherein the substantially similar etch rates are etch rates that vary by less than about 5%.

25. An apparatus according to claim 24 wherein the volumetric flow ratio of the fluorine-containing gas to the chlorine-containing gas is from about 2:1 to about 8:1.

26. An apparatus according to claim 25 wherein the fluorine-containing gas comprises one or more of NF_3, CF_4 or SF_6.

27. An apparatus according to claim 26 wherein the chlorine-containing gas comprises one or more of Cl_2 or HCl.

28. An apparatus according to claim 26 wherein the sidewall-passivation gas comprises one or more of nitrogen, hydrogen or carbon monoxide.

29. An apparatus according to claim 28 wherein the volumetric flow ratio of the fluorine-containing and chlorine-containing gas to the sidewall-passivation gas is from about 1:1 to about 10:1.

30. An apparatus according to claim 26 wherein the controller is adapted not to provide [illegible] CH_2Br

31. An apparatus according to claim 26 wherein the controller is adapted to provide in the process chamber, a second energized gas comprising HBr.

32. A method of etching a silicon-containing material on a substrate, the method comprising:

placing the substrate in a process chamber;

in a first etching stage, providing in the process chamber, a first energized gas comprising fluorine-containing gas, chlorine-containing gas and sidewall-passivation gas, the first energized gas being absent HBr, Br_2 or CH_3Br; and

in a second etching stage, providing in the process chamber, a second energized gas comprising HBr, Br_2 or CH_3Br.

33. A method according to claim 32 wherein the silicon-containing material on the substrate comprises regions having different compositions, and wherein the first energized gas comprises a volumetric flow ratio fluorine-containing gas, chlorine-containing gas and sidewall-passivation gas, that is selected to etch the regions having different compositions at substantially similar etch rates.

34. A method according to claim 33 wherein the silicon-containing material comprises polysilicon.

35. A method according to claim 33 wherein the regions having different compositions comprise dopant in a plurality of concentrations or types.

36. A method according to claim 33 wherein the substantially similar etch rates are etch rates that vary by less than about 5%.

37. A method according to claim 32 wherein the first energized process gas comprises a volumetric flow ratio of fluorine-containing gas to chlorine-containing gas that is from about 2:1 to about 8:1.

38. A method according to claim 32 wherein the fluorine-containing gas comprises one or more of NF_3, CF_4 or SF_6.

39. A method according to claim 32 wherein the chlorine-containing gas comprises one or more of Cl_2 or HCl.

40. A method according to claim 32 wherein the sidewall-passivation gas comprises one or more of nitrogen, hydrogen or carbon-monoxide.

41. A method according to claim 32 wherein the volumetric flow ratio of the fluorine-containing and chlorine-containing gas to the sidewall-passivation gas is from 1:1 to about 10:1.

42. A method according to claim 32 wherein the second energized gas comprises HBr.

43. A method according to claim 42 wherein the second energized gas further comprises one or more of Cl_2, $He\text{-}O_2$ and CF_4.